The Effect of Blended Objects on METACALIBRATION

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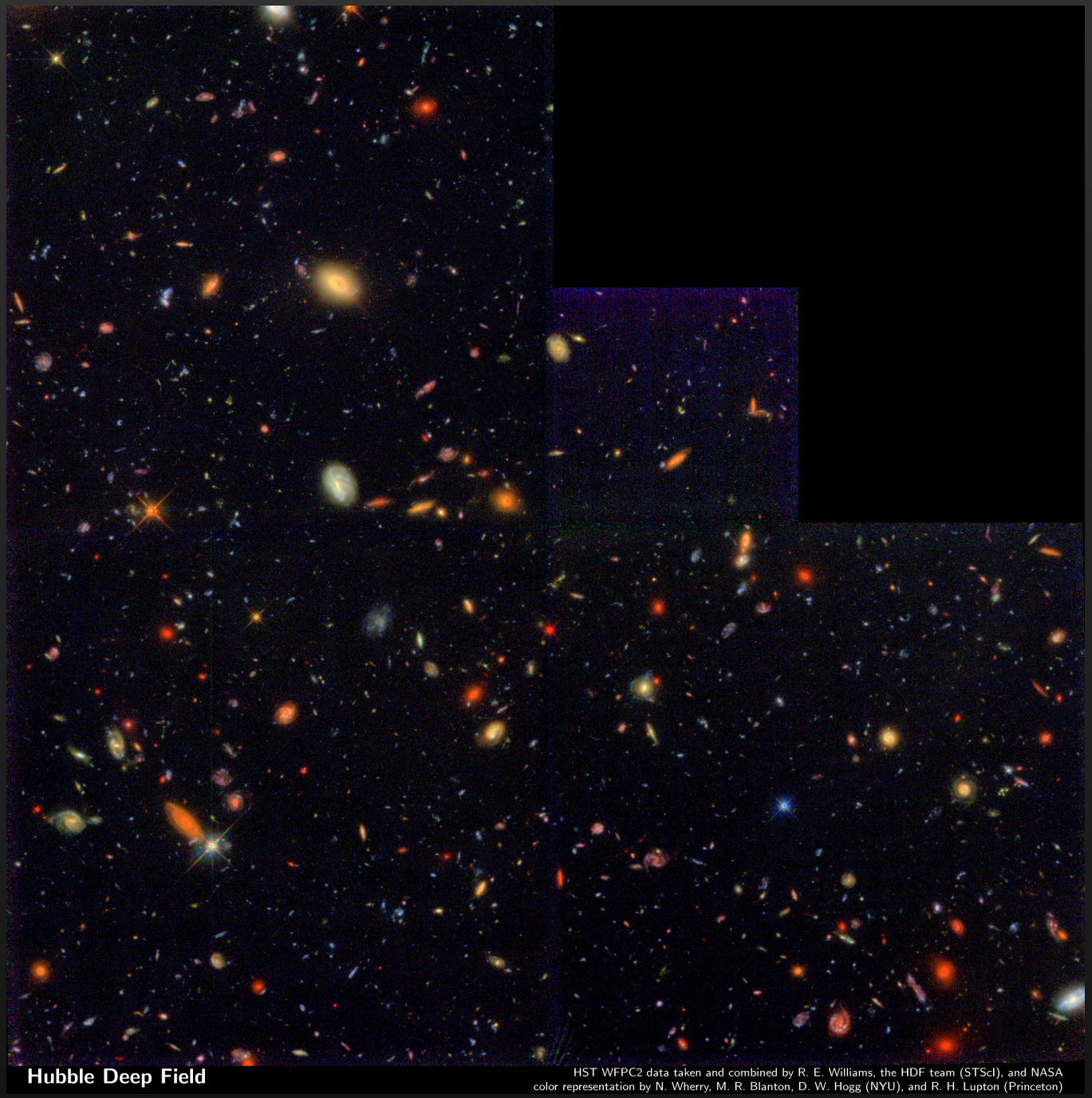
Outline

- Blended Objects
- Simulations
- Preliminary Results

Blended Objects

- In DES we identified blending as the most important systematic for shear estimation.
- Blending is the scenario where the images of multiple objects overlaps on the sky.
- Blending can occur for objects that are physically associated, or for chance projections
  - Faint galaxies that are below the detection threshold are counted as part of the galaxy or part of the background
- Can concievably cause instability in the model fitting algorithm, which may cause errors in the shear calibration.
- More importantly, can cause biases in redshift determination: beyond the scope of this project.



Hubble Deep Field

HST WFPC2 data taken and combined by R. E. Williams, the HDF team (STScI), and NASA
color representation by N. Wherry, M. R. Blanton, D. W. Hogg (NYU), and R. H. Lupton (Princeton)

Simulations

- Take size and flux distribution from COSMOS, depth $i = 25.2$
- "Fake" the fainter galaxies to $i \sim 27.5$ by scaling galaxy flux. Also scale down the sizes. Add some stars and very big bright galaxies as well.
- Noise level appropriate for DES: detection threshold approximately $i = 24.1$
- Galaxies placed randomly on the sky.
- Two different source planes, with shears $\gamma_1 = 0.01$ and $\gamma_2 = 0.02$

Example Simulation

Example Simulation

Example Simulation

Preliminary Results: Multiplicative Bias m

- Masking the light from neighbors (see Jarvis, Sheldon et al. 2015)
- Errors are 95% confidence
- $S/N > 10$ $m : +(4.6 \pm 3.9) \times 10^{-3}$
- $S/N > 15$ $m : -(0.6 \pm 4.1) \times 10^{-3}$
- $S/N > 20$ $m : +(1.1 \pm 4.6) \times 10^{-3}$

Future Work

- Get more statistics
- Run in a mode where neighbor light is subtracted.